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APPLICATION OF HYPOXIC ANESTHESIA IN HYPOPHYSECTOMY

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[A Digest]

To avoid the danger of asphyxiation during parapharyngeal hypophysectomy on a rat, we replaced the usual ether anesthesia with anesthesia produced by lowering the animal's temperature to about 15 degrees centigrade. The latter was achieved by gradually depriving the animal of oxygen at a surrounding temperature lower than 15 degrees centigrade.

A rat whose temperature has been reduced to 15 degrees centigade owing to lack of oxygen is in a state of deep anesthesia, being absolutely motionless and not responsive to external stimuli. Its respiratory movements become very intermittent (espaces) and the heart beats slow down. The oxygen consumption of the animal is barely 15 percent of that under normal conditions at the same external temperature.

The resistance to asphyxiation is greatly increased for that reason, which represents a considerable advantage for carrying out the hypophysectomy. Other conditions accompanying the lethargic state produced in this manner are also of advantage. This refers to low blood pressure, reduced hemorrhage, etc. The immobility of the experimental animal is absolute and there is no danger of sudden movements. On may extend without inconvenience the length of the operation. The postoperative effects are eliminated.

On the basis of work done by I. Djaja, who described the deep hypoxic lowering of temperature produced in homoiothermic (warm-blooded) animals by exposing them to gradually decreasing barometric pressures, we have employed the following method for bringing about a lethargic state in the rat. Instead of gradually reducing the barometric pressure, we placed the rat into a hermetically sealed container which was submerged in cold water having a temperature lower than

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15 degrees centigrade. In consuming the oxygen available in the confined space, the animal under these conditions exposes itself to a gradually increasing hypoxia which results in a lowering of body temperature. Asphyxiation is avoided by opening the container from time to time in order to supply some air. At the expiration of 1-2 hours the temperature of the animal drops to approximately 15 degrees centigrade. We used jars with a capacity of from one-half of a liter to 3 liters depending on the size of the rat. Under the conditions described, the experimental animal does not warm up after being transferred to fresh air unless the temperature of the surrounding air is higher than its body temperature.

The temperature of the animal must be maintained at a level of about 15 degrees centigrade during the operation. This is achieved by filling with ice a drawer located under the metal top of the operating table. The readings of a thermometer kept constantly in the animal's rectum indicate whether the anesthesia is continued or not. This is the sole means of control.

When the operation is finished, the animal is slowly warmed up. After its temperature has reached 20-25 degrees centigrade, the animal regains its feet and recovers completely.

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